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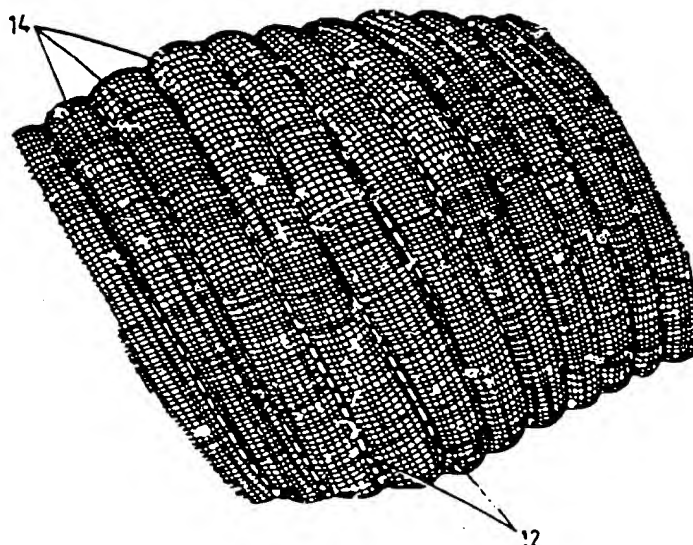
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(54) Title: SUBSTANTIALLY TRANSPARENT KNITTED MEAT CASING



(57) Abstract

A tubular casing (10) for location around a food product (in particular, a meat product) prior to cooking or curing, and which has a substantially transparent appearance when said food product is located therein, which comprises a knitted tubular portion (11) produced in continuous lengths from translucent yarn, the wall of said knitted tubular portion (11) having a stretchable loop-style stitching pattern which results in greater than 50 % open area when the stitches are fully extended but which is substantially impermeable to said food product, and circumferential elastic reinforcement threads (12) secured to and spaced along said knitted tubular portion that become taut while said knitted tubular portion remains stretchable as said food product is located within said knitted tubular portion so that said circumferential elastic reinforcement threads (12) press into the surface of said food product. This produces a distinctive surface pattern, with the food product protruding within bands (14) between the circumferential restrictions.

## SUBSTANTIALLY TRANSPARENT KNITTED MEAT CASING.

This invention relates to an improved meat casing, and in particular to a meat casing having a particular type of knit in combination with circumferential elastic reinforcement to produce a substantially transparent casing.

In the following description, the terms "casing" and "meat product" shall have the meanings given hereunder:

"Casing"                      any synthetic or natural tubular material used in the processing of meat products.

"Meat product"              any fresh or processed meat product.

In the manufacture of such meat products, natural or artificial casings in the form of elongated tubes are normally pumped full of meat from a machine specifically designed for the purpose. Such a machine normally comprises a feed mechanism for injecting meat through a delivery tube or injection horn, where the casing is shirred to the external surface of the delivery tube. A clip or other closure means is placed over the ends of the casing, and a quantity of meat is then injected into the casing. Depending upon desired length of the meat product, the process is interrupted at various stages so that clips or twists may be applied.

In such machines it is normal to make use of artificial skins such as collagen based casings or fibrous casings. Such casings are produced in a variety of wall thickness, and the production rate and injection pressures will determine the thickness of the casing that is used.

The thinner walled casings are generally unsatisfactory for high production rate machines. These machines operate at much higher injection pressures, and thinner casings will split at higher pressures.

However, as the thicker walled casings are much more expensive, there is a tendency to use the thinner walled casings and to reduce the injection pressure and therefore production rate of the injection machinery. Although there is a reduced cost in consumables, there is also a reduced production rate.

In order to overcome this problem, use can be made of circumferential elastic members which are incorporated into a knitted fabric tube. The circumferential reinforcing cords are placed under tension as the casing is filled, and the strength of the cords and the knitted material provides sufficient strength to withstand bursting. Knitted material produces a stretch fabric and it is possible to produce a fabric that is sufficiently close in knit to cause retention of both meat products and fluid or juices contained within the meat. Although the weave is sufficiently tight to cause a fluid barrier, the material is still gas permeable and therefore allows conventional curing or smoking of the product.

Although the above-described casing is extremely useful, it results in the meat product having an opaque casing on its outer surface. In some instances, this is quite acceptable, as the casing is removed from the meat product subsequent to the cooking or curing process. However, it would be an advantage if a casing were able to be substantially transparent so that it could be left on the meat product.

Therefore, it is an object of this invention to provide a casing having elastic reinforcement members which is substantially transparent when placed on the meat product.

Another problem with some casings is the tendency for the casing to stick to the outer surface of the meat. This results in the meat tearing when the casing is removed. Therefore, it is a further aspect of this invention to overcome this particular problem.

In its broadest form, the invention comprises a tubular casing comprising a knitted tube, produced in continuous lengths, with circumferential elastic cords incorporated therein, the invention being characterised by the use of a stitch in the knitting process which results in a very open knitted fabric when the casing is filled and the fabric is stretched.

Preferably, the knitting process uses a loop-style stitching which results in a greater than 50% open area when the stitch is fully extended. This results in a substantial portion of the meat surface being exposed which results in a substantially transparent appearance for the casing. Therefore, when the casing is on the meat product, the circumferential elastic reinforcement members will be clearly visible, but the area between the circumferential cords will be substantially transparent.

In addition, translucent monofilament or multifilament yarns are used which further assist in producing a translucent effect. They also have the advantage of being non-absorbent.

Clearly, an important aspect of the invention is to produce an open knitted stitch which results in the transparent appearance. A further advantage is the minimal surface contact between the casing and the meat product and the use of synthetic non-absorbent yarn, which both result in a reduced tendency for the casing to stick to the meat product. Accordingly, the invention meets the two main objectives.

Nevertheless, there will be surface contact between any xuded moisture and/or fat content from the meat product and the filaments of the casing. The moisture and/or fat will tend to coat the filaments of the casing, thus augmenting the transparent effect, yet without the filaments being embedded in the surface of the meat product.

Preferably, the diameter of the circumferential reinforcing cords is significantly less in the relaxed state prior to filling than at the maximum filled diameter of the casing. This results in the elastic cords providing a compression effect around the meat product placed within the casing, which produces a pleasing decorative effect along the surface of the meat product. It also ensures that sufficient compressive force is applied to the meat product to reduce air pockets within the meat as it shrinks during the cooking or curing process.

In addition to the use of circumferential reinforcing members, the invention will also include the use of longitudinal reinforcement members in combination with the circumferential members. The longitudinal members may also be also elastic, or may comprise inextensible longitudinal cords.

The circumferential or longitudinal members may be knitted either on the internal surface or external surface of the casing. In some instances, with the reinforcement cords being located on the external surface of the casing, there will be a decreased tendency for the cords to adhere to the meat surface.

Although the plural term "circumferential cords" is used, it will be realised that the circumferential cords may result from one or more spirals being knitted into the casing along its length.

In order for the invention to be fully understood, preferred embodiments will now be described, but it should be realised that the invention is not to be confined or restricted to the precise details of these embodiments. In the accompanying drawings,

Fig. 1 shows a portion of a tubular casing according to a first embodiment of the invention;

Fig. 2 is a close-up view of the pattern of threads in this first embodiment;

Fig. 3 is a close-up view of a portion of the tubular casing according to this first embodiment when it has a food product located within to the extent that the circumferential elastic reinforcement members become inextensible, producing a decorative effect along the surface of the food product; and

Fig. 4 is a close-up view of a filled casing according to a second embodiment of the invention, where the casing further comprises longitudinal reinforcement members.

In the first embodiment shown in Figs. 1 to 3, a tubular casing 10 comprises a tubular knitted portion 11 and circumferential elastic reinforcement members 12. In this embodiment, the material used for tubular portion 11 is a translucent polyester thread, and circumferential members 12 are formed from elasticated threads.

Tubular portion 11 is produced by a knitting process. In this embodiment, a jersey knit is used, and the circumferential members 12 are on the inside of tubular casing 10. The elasticated thread of circumferential members 12 is attached to the internal surface of tubular portion 11 by tuck stitches 13 and, in this embodiment, the elasticated thread is preferably bound in a cotton thread. The elastic circumferential thread 12 may form separate rings, as shown, or alternatively form a spiral along the length of tubular portion 11.

When the tubular casing 10 is being filled with a meat product, the circumferential threads 12 will begin to impress against the surface of the meat product while the tubular knitted portion 11 is still quite stretchable. This results in the circumferential threads 12 embedding or forcing their way into the surface of the meat product whereupon the meat product protrudes as a result of tubular portion 11 still being stretchable. As shown in Fig. 3, the circumferential threads 12 form a distinctive surface pattern. When the required amount of meat product is located within the tubular casing 10, the circumferential threads 12 are embedded into the surface of the meat product, whereas the meat product protrudes within each of the bands 14. This results in the distinctive surface pattern being applied to the meat product.

In the second embodiment shown in Fig. 4, there is a similar system of longitudinal threads 15, formed from elastic thread.

The circumferential threads 12 and longitudinal threads 15 are securely stitched to tubular portion 11 at points of intersection of the circumferential and longitudinal threads 12 and 15, by means of tuck stitches.

Preferably, longitudinal threads 15 are formed from a plurality of interengaging loops. The thread that forms the longitudinal thread 15 extends along and is secured to the elastic circumferential thread 12, whereupon it reaches a predetermined point and a loop is formed. The loop is extended downwardly and locates around the base of a lower loop and then extends upwardly whereupon it again extends along the elastic circumferential thread 12. If the elastic circumferential thread 12 is formed as a continuous spiral, the longitudinal thread 15 may be formed as the knitting of tubular portion 11 and placement of the elastic circumferential thread 12 progresses.



The use of the loop stitch form to produce the longitudinal threads 15 means that there is a degree of movement of the stitch before it is stretched to its limit. Therefore, the tubular casing 10 is able to expand longitudinally as well as circumferentially before the longitudinal elastic threads 15 begin to impress against the surface of the meat product. Both the longitudinal threads 15 and the circumferential threads 12 are drawn deeply into the surface of the meat product. This results in an extensive quilting pattern, as shown in Fig. 4, with the food product forming outward bulges 16 between the grid formed by the longitudinal and circumferential threads.

The invention described in accordance with these embodiments is capable of being used in either a cooking or curing process, with respect to meat and other food products. It has been found that the tubular casing 10 is readily removed from the surface of the food product when it has been cooked or cured. This results in the desired surface pattern remaining on the food product.

## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A tubular casing for location around a food product prior to cooking or curing, and which has a substantially transparent appearance when said food product is located therein, comprising:

a knitted tubular portion produced in continuous lengths from translucent yarn, the wall of said knitted tubular portion having a stretchable loop-style stitching pattern which results in greater than 50% open area when the stitches are fully extended but which is substantially impermeable to said food product, and circumferential elastic reinforcement threads secured to and spaced along said knitted tubular portion that become taut while said knitted tubular portion remains stretchable as said food product is located within said knitted tubular portion so that said circumferential elastic reinforcement threads press into the surface of said food product.

2. A tubular casing according to claim 1, wherein said circumferential elastic reinforcement threads form separate rings.

3. A tubular casing according to claim 1, wherein said circumferential elastic reinforcement threads are in the form of a continuous spiral.

4. A tubular casing according to any one of claims 1 to 3, wherein said circumferential elastic reinforcement threads are secured to said knitted tubular portion as it is being knitted.

5. A tubular casing according to any one of claims 1 to 4, wherein said circumferential elastic reinforcement threads are secured to the inside surface of said knitted tubular portion.

6. A tubular casing according to any one of claims 1 to 4, wherein said circumferential reinforcement threads are secured to the outside surface of said knitted tubular portion.

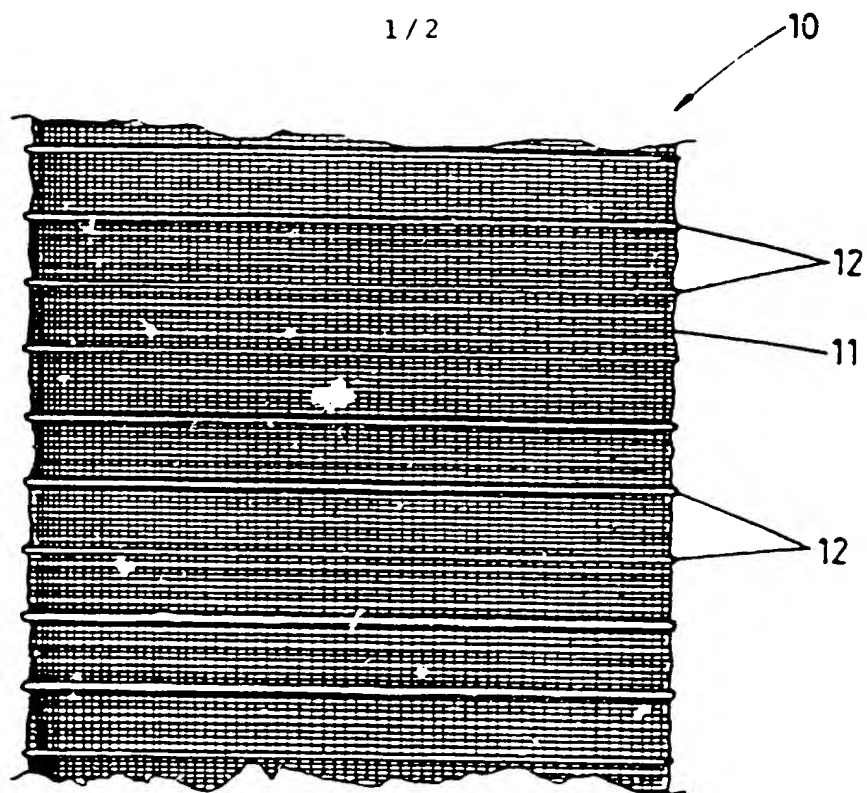
7. A tubular casing according to any one of claims 1 to 6, further comprising longitudinal threads secured to and spaced around said knitted tubular portion that become taut while said knitted tubular portion remains stretchable as said food product is located within said knitted tubular portion so that said circumferential elastic reinforcement threads and said longitudinal threads press into the surface of said food product such that a quilted-like surface pattern is applied to the surface of said food product.

8. A tubular casing according to claim 7, wherein said longitudinal threads are elastic.

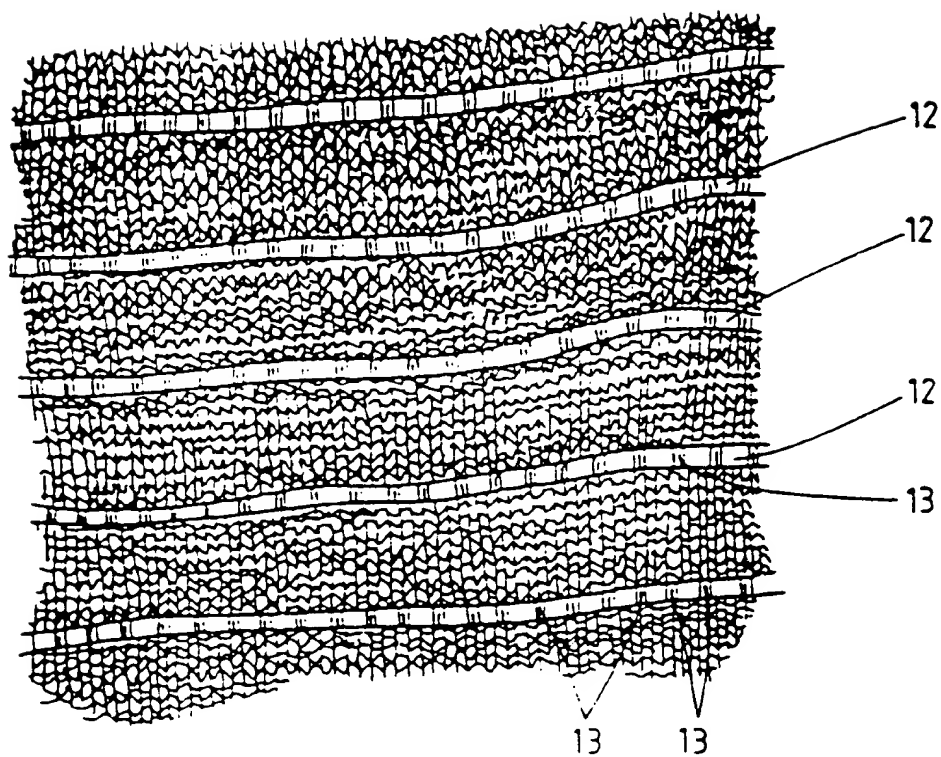
9. A tubular casing according to claim 7, wherein said longitudinal threads are inextensible.

10. A tubular casing according to any one of claims 1 to 9, wherein said food product is a meat product.

11. A tubular casing substantially as hereinbefore described and with reference to and as illustrated in the accompanying drawings.

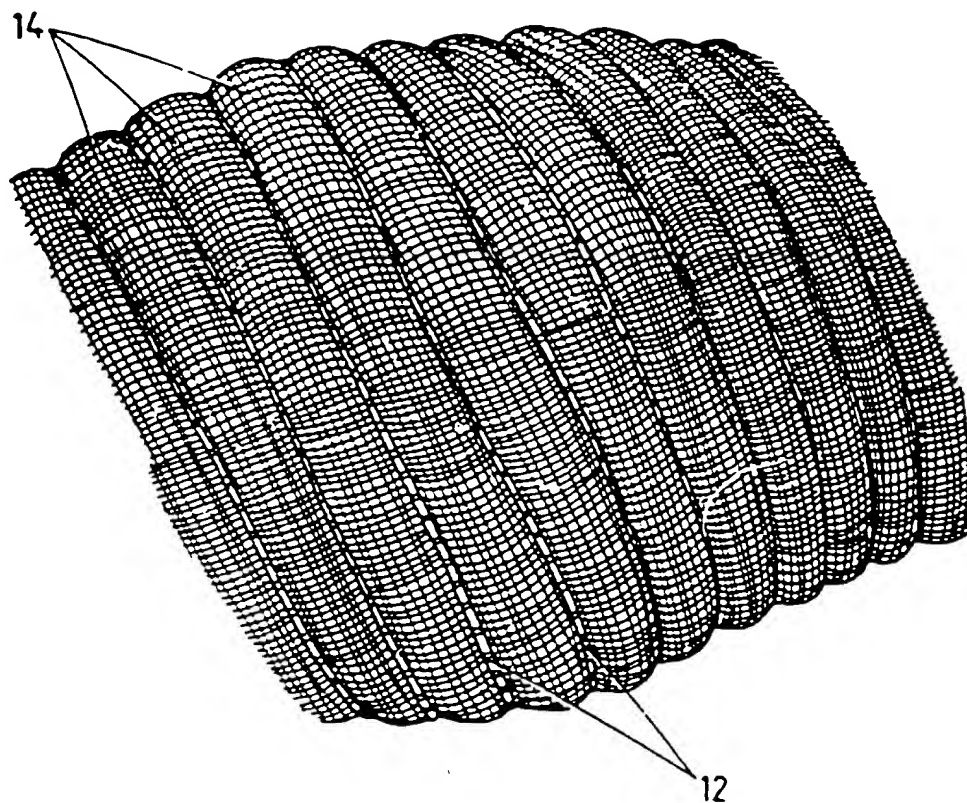


**FIG 1**

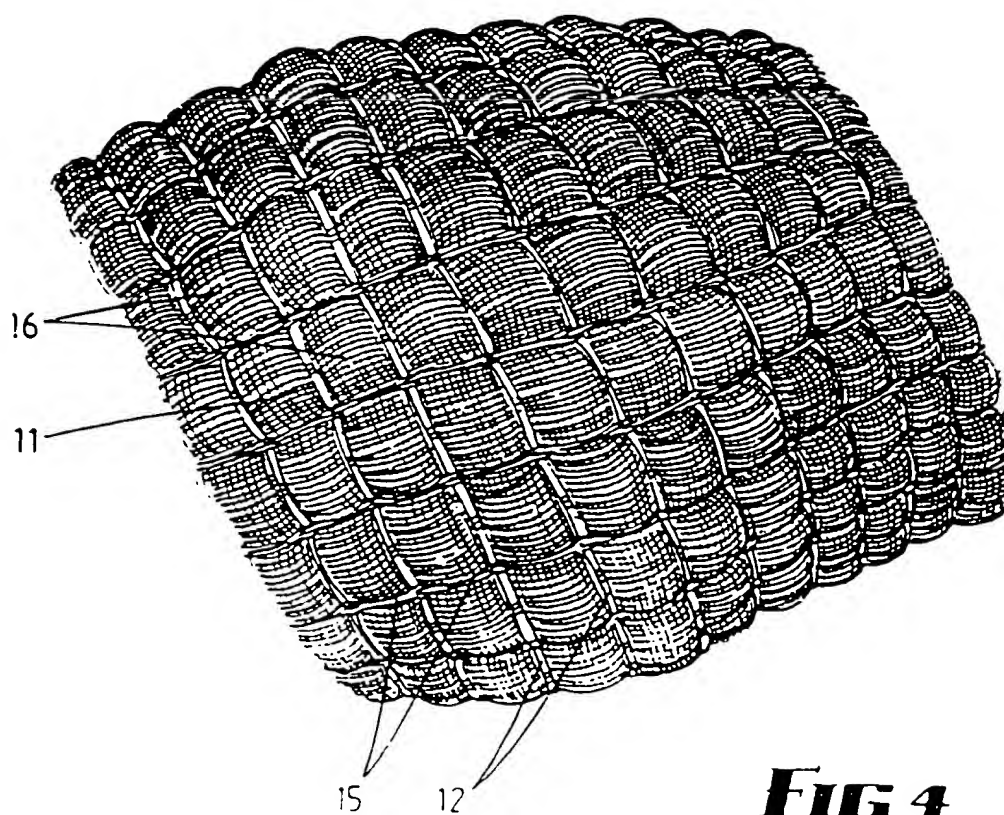


**FIG 2**

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**FIG 3**



**FIG 4**

# INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 95/00415

## C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	AU 10054/76 (497617) B (CONFUGA GmbH) 14 July 1977 Whole document	1-10
A	AU 39916/72 A (CHERIO et al) 20 September 1973 Pages 4-5	1
A	AU 46595/68 (443080) B (ETABLISSEMENT PAL) 28 May 1970 Whole document	1
A	AU 15114/62 (255070) B (HAEMMERLE) 12 September 1973 (& AU 44730/64, pages 3-5) Pages 8-11	1

# INTERNATIONAL SEARCH REPORT

## Information on patent family members

International Application No.

PCT/AU 95/00415

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
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EP	557061	CA	2089503	US	5413148		
AU	46123/93	AU	61767/94	WO	9118843		
AU	50660/93						
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AU	15114/62	AU	44730/64	GR	993531	CH	393122
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		US	3178910				
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